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Recognition of a sibling species of the Australian *Eutermiphora abdominalis* Lea (Diptera: Phoridae)

R. H. L. Disney

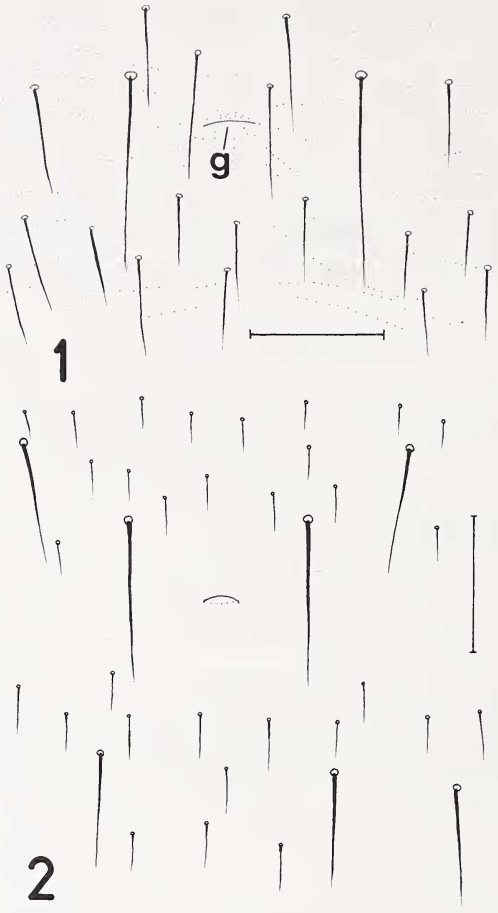
Abstract. *Eutermiphora watsoni* sp. n. is distinguished from the type species of the genus, *E. abdominalis* Lea 1911. The females of both species live in the colonies of *Nasutitermes fumigatus* (Brauer 1865) in New South Wales. The taxonomic significance of the position of the pre-apical setae of the palps is discussed, with particular reference to the problem of the affinities of the Termitoxeniinae.

Key words. Diptera, Phoridae, new species, Isoptera, Termitidae.

Introduction

The aberrant termitophilous genus *Eutermiphora Lea* (1911) (Diptera: Phoridae) was established for a single female from a termite's nest at Sydney, New South Wales, Australia. Unfortunately Lea overlooked both the wing stumps and halteres that, in mature females, are concealed beneath a forward extension of the anterior region of the abdomen that covers much of the thorax. The result was to cause confusion in keys to genera and in attempts to determine the affinities of this genus, apart from its assignment to the Metopininae. Lea's description is very brief and has a single sketchy figure of the whole fly. Beyer's detailed, but turgid, redescription, based on two females from Victoria, is longer but devoid of figures. Furthermore he also overlooked the halteres and wing stumps. Seven females of *Eutermiphora* from a colony of *Nasutitermes fumigatus* (Brauer 1865) at Braidwood, New South Wales, allowed recognition that the mature females retain halteres and wing stumps (it being probable that the young females shed their wing membranes upon entering the termite colony, as with Termitoxeniinae). In the light of this discovery, an illustrated reappraisal of the genus was provided (Disney 1989). On a recent trip to Australia I collected a single female *Eutermiphora* from a colony of *Nasutitermes fumigatus* at Berowra, north of Sydney. On slide mounting this specimen, it proved to be a sibling species of the series from Braidwood. I therefore borrowed the type of *E. abdominalis*. The specimen from Berowra is conspecific. It is concluded that the series from Braidwood constitutes a hitherto unrecognised sibling species. It is named below, its description augmented and its distinction from *E. abdominalis* specified.

The genus *Eutermiphora* is characterised by Disney (1989) and included in the latest key to the genera of the Phoridae of the world (Disney 1994). It is currently only known from mature, flightless-stage, females.



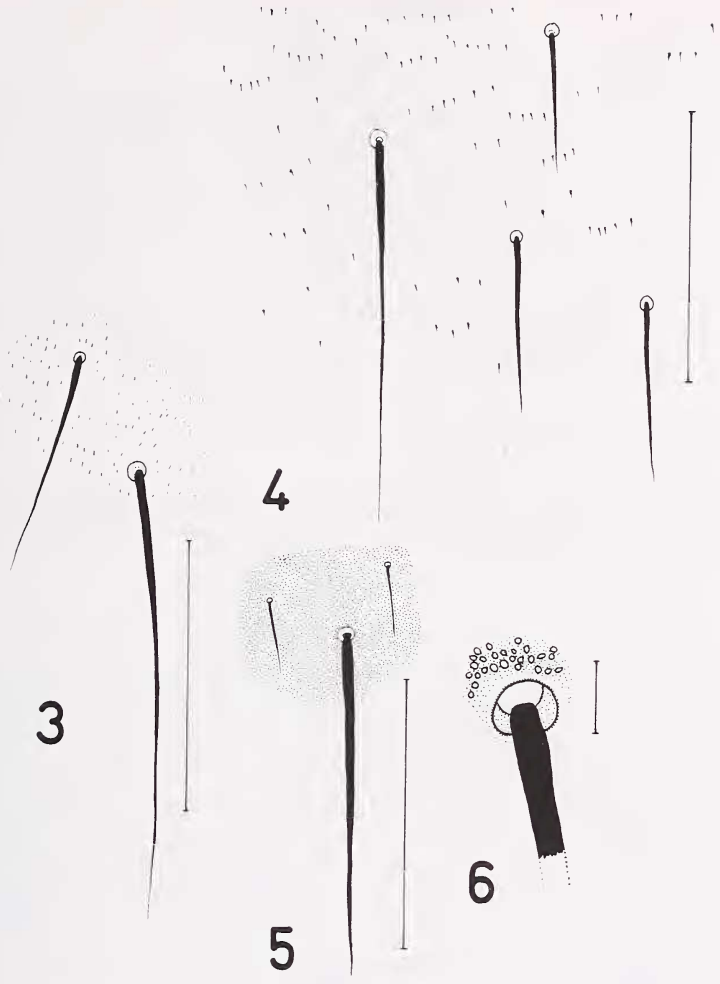
Figs 1—2: *Eutermiphora* females, gland openings (g) at rear of dorsal faces of fifth abdominal segments. 1, *E. watsoni*; 2, *E. abdominalis*. (Scale bars = 0.1 mm).

Eutermiphora abdominalis Lea, 1911

Eutermiphora abdominalis Lea, 1911: 77. Holotype ♀, AUSTRALIA, New South Wales, Sydney (South Australien Museum, Adelaide) [examined].
Beyer, 1966: 214. 2 ♀, AUSTRALIA, Victoria, Echuca, 1. 1. 1936. (National Museum of Victoria, Melbourne) (the specimens appear to have been lost).

Lea (1911) provided a single figure of the whole fly. His holotype is now remounted on a slide. The principal difference from the newly-recognised species is in the hairing and microtrichia of the abdomen (see below). The microtrichia are exceptionally small and densely crowded (Fig. 5). The measurements in Beyer's redescription allow recognition that his specimens belong to this species.

Female (Figs 2, 5, 8, 10—11).



Figs 3—6: *Eutermiphora* females, abdominal hairs and microtrichia on dorsal face. 3, *E. watsoni*, fifth segment; 4, *E. watsoni*, third segment; 5, *E. abdominalis*, fifth segment; 6, *E. watsoni*, base of bristle on segment 3. (Scale bars = 0.1 mm for 3—5 and 0.01 mm for 6).

The host reported for this species by Lea (1911) was *"Eutermes fumipennis"*, now called *Nasutitermes fumipennis* (Walker). However, this species is now known not to occur in Australia and Watson & Gay (1980) suggested that most Australian records of this species were probably really *Nasutitermes exitiosus* (Hill) or, in a few cases, *N. walkeri* (Hill). However, there is a single soldier termite mounted with Lea's holotype of this fly. I have now identified this termite as *N. fumigatus*.

New material examined: ♀, New South Wales, Berowra, 7. VI. 1995 (R. H. L. Disney), in galleries of *Nasutitermes fumigatus* in log.

Eutermiphora watsoni sp. n.

Eutermiphora abdominalis Disney 1989: 435. Misidentification

Female only known (Figs 1, 3—4, 6—7, 9, 12) The figures supplement those given elsewhere (figs 1—5 in Disney 1989, figs 6.1d, 8.46a—b in Disney 1994). This species is a little larger than *E. abdominalis*. The third segment of the arista is at least 0.2 mm long, but is nearer 0.1 mm in *E. abdominalis*. The apical bristle of the palp is longer than the subapical bristle, but is shorter than the subapical in *E. abdominalis*. The hairs of the dorsal face of the abdomen are less sharply divided into two distinct series, of long bristle-like hairs and short hairs. There is a more continuous gradation from long to short hairs (cf Figs 1 and 2). A clear difference is that the microtrichia of the upper faces of abdominal segments 2—6 are much larger and fewer in number (Figs 3—4), only being at all dense in the vicinity of the gland opening (g in Fig. 1) at the rear of segment 5. Especially on segment 2, these microtrichia tend to be arranged in irregular transverse rows (as in Fig. 1). The metatarsi of the front and hind legs are more elongated than those of *E. abdominalis* (Figs 7—10).

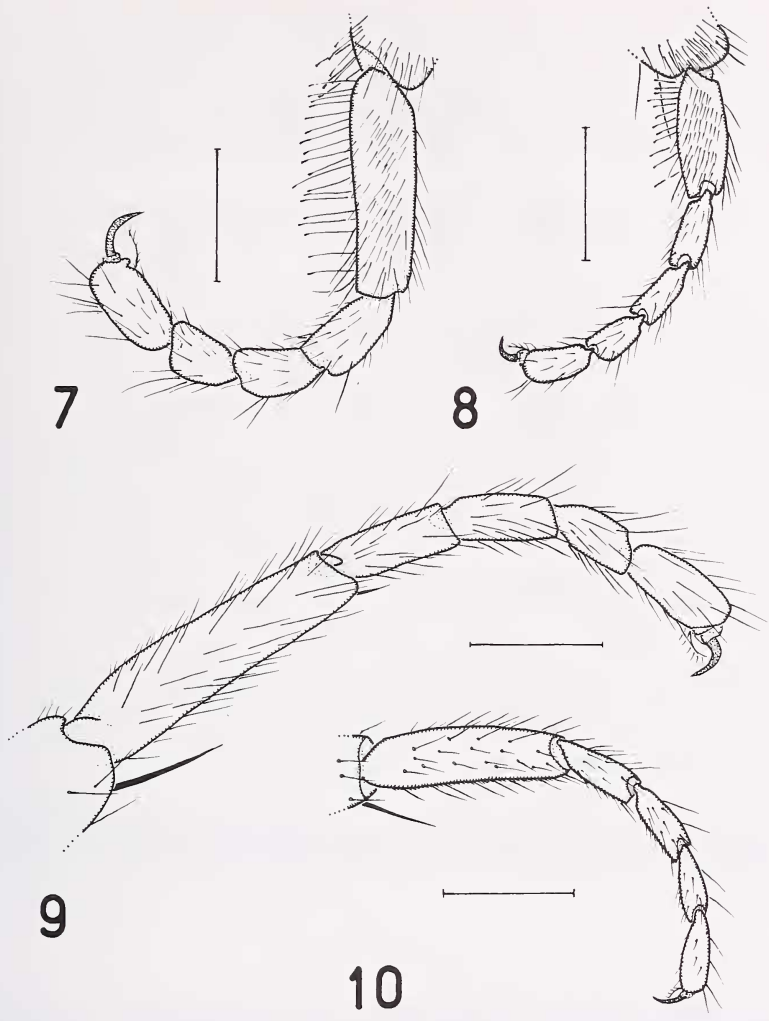
Etymology: The species is named in memory of the late Dr J. A. Watson, who gave me valuable information and publications on Australian termites.

Holotype ♀, AUSTRALIA, New South Wales, about 12 miles west of Braidwood, from nest of *Nasutitermes fumigatus*, 11. V. 1960 (F. J. Gay) (Australian National Insect Collection, CSIRO, Canberra). 6 ♀ paratypes, same data as holotype except three deposited in University Museum of Zoology, Cambridge.

Discussion

The achievement of a satisfactory supra-generic classification of the Phoridae is still a long way off, and is the subject of current controversy. The subfamilies Termitoxeniinae and Thaumatoxeninae are well circumscribed, but their affinities with the rest of the family remain obscure (Disney & Kistner 1992, 1995). The Aenigmatiinae are probably a polyphyletic assemblage reflecting convergent evolution. The largest subfamily, the Metopininae, embraces the probably monophyletic Megaseliini, the almost certainly polyphyletic Beckerinini and the probably paraphyletic Metopinini. The remaining subfamily, the Phorinae, is likewise probably paraphyletic. Brown's (1992) proposals designed to rectify some of these defects have served to highlight the latter. However, the proposals themselves have precipitated current controversies (Disney 1993, 1994, Brown 1995, Disney 1995a, 1996). In view of this I highlight an interesting feature of the genus *Eutermiphora*. The palps carry the pre-apical differentiated setae on the external face (Fig. 12), rather than on the internal face like most Phoridae. The patterns of distribution of these setae in different families and genera is reviewed below.

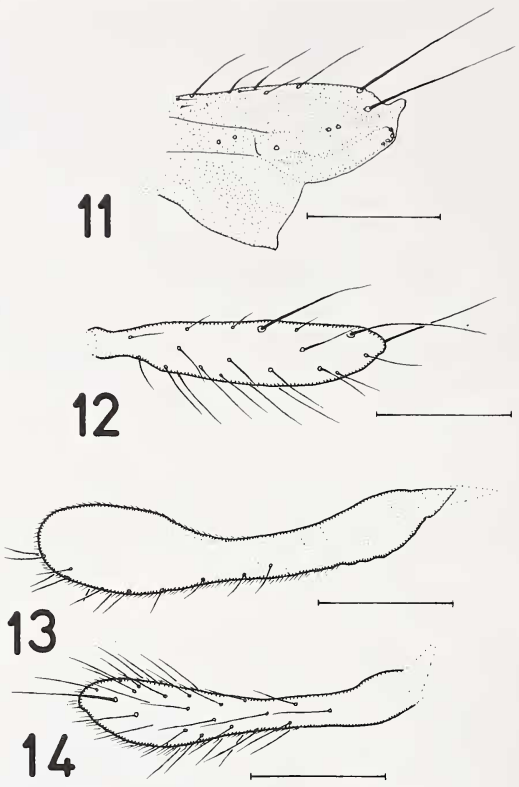
In the Sciadoceridae, the putative sister group of the Phoridae (Cumming et al. 1995), the differentiated setae on the palps are all weak and restricted to the vicinity of the lower margin, but with most being submarginal on the outer face (Fig. 13). In the putative sister group of the Sciadoceridae+Phoridae, the Ironomyiidae, the setae are larger and more numerous and appear to occur on both faces (Figs 1—2 in McAlpine 1967). This is certainly the case in the supposedly related Lonchopteridae, in which the setae are well developed on both faces of the palp, but are more numerous and stronger on the outer face (Fig. 14). In the presumed basal family of the Cyclorrhapha, the Platypezidae, many genera have no differentiated setae on the



Figs 7—10: *Eutermiphora* females, anterior faces of tarsi. 7, *E. watsoni*, front leg; 8, *E. abdominals*, front leg; 9, *E. watsoni*, hind leg; 10, *E. abdominalis*, hind leg. (Scale bars = 0.1 mm).

palps. Others, e. g. *Agathomyia* Verrall, have strongly differentiated setae on the lower margin and inner face of the palp. The related Opetiidae, have no differentiated setae on the palps. In the Empidoidea differentiated setae on the outer face of the palp are common, often with the apical setae further differentiated as bristles. The inner face is typically devoid of differentiated setae.

Taken overall, the above outgroup comparisons suggest that the groundplan state in the Cyclorrhapha is possibly with differentiated setae on the both faces of the palp



Figs 11—14: 11—12: *Eutermiphora* females: 11, *E. abdominalis*, right wing stump; 12, *E. watsoni*, right palp. 13—14: Left palps: 13, *Sciadocera rufomaculata* female; 14, *Lonchoptera lutea* male. (Scale bars = 0.1 mm).

but more strongly on the outer face, with one or more apical or subapical setae further differentiated as stronger setae or bristles. Thus *Lonchoptera* possibly represents the groundplan state.

Within the Phoridae every variety of palp setal pattern is encountered, but most frequently the setae are on the inner face with the apical bristles differentiated in varying degrees. The condition reported for *Eutermiphora* (Fig. 12), therefore, is atypical. However, this pattern is characteristic of all Termitoxeniinae (Disney & Kistner 1995). Furthermore, it occurs in some Metopininae. In most Megaseliini the inner face carries the setae and the apex has differentiated bristles, but in a few species the setae are reduced or lost. In many Metopinini also the pre-apical setae are on the inner face; for example *Chonocephalus* Wandolleck and *Echidnophora* Schmitz. In the case of the latter, this observation reinforces the finding that the resemblance between Termitoxeniinae and *Echidnophora* is due to convergence (Disney 1995b). However, the termitophilous metopinine genera *Bolsiusia* Schmitz

and *Penthaplus* Schmitz, like *Eutermiphora*, have the pre-apical setae on the outer face of the palp, as does the type genus of the Metopinini, *Metopina* Macquart. It is possible, therefore, that this feature is a synapomorphy that unites these genera with the Termitoxeniinae. However, we do not know the extent to which this feature may have evolved independently more than once, and even symplesiomorphy cannot be ruled out.

These observations on palp setal pattern suggest the hypothesis that *Eutermiphora* might be phylogenetically related to the Termitoxeniinae. The female's abdominal physogastry, the shortened costa in relation to the shedding of the wing membranes (presumably at the time of entry to the termite host's nest), the lack of axillary bristles on the wing, the reduction in the size and/or density of the microtrichia on the top of the abdomen and the leg chaetotaxy are additional features of resemblance. The mid-mesopleural ridge and the gland opening at the rear of abdominal segment 5 (g in Fig. 1) distinguish *Eutermiphora* and allow its assignment to the Metopininae. The tapered labella of the proboscis (fig. 2 in Disney 1989) are very similar to those of many Termitoxeniinae. However, this feature is probably not a groundplan feature of the latter subfamily (Disney & Kistner 1995) and so this resemblance most likely represents an example of convergent evolution.

The small, subcircular, features clustered around the bases of some abdominal bristles (Fig. 6) invite further investigation. Fresh specimens examined with the scanning electron microscope should establish whether these features are perforations, thus indicating that the associated bristles are probably primitive solutrichomes that produce a placatory exudate licked up by the host-termite workers (Disney 1995b, Disney & Kistner 1995). So far solutrichome bristles are only known from Termitoxeniinae.

The procurement of the unknown males of *Eutermiphora* would be likely to reveal whether the majority of the similarities between this metopinine genus and Termitoxeniinae are due to affinity or convergence.

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Zusammenfassung

Eutermiphora watsoni sp. n. wird von *E. abdominalis* Lea 1911, der bisher einzigen Art und Typusart der Gattung, unterschieden. Die Weibchen beider Arten leben in Kolonien von *Nasutitermes fumigatus* (Brauer 1865) in New South Wales. Die Anordnung der präapikalen Borsten auf den Maxillarpalpen wird als Merkmal erörtert, besonders im Hinblick auf die ungeklärte systematische Stellung der Termitoxeniinae.

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